

WHAT IS CLAIMED IS:

1. An image processing apparatus for encoding input moving image data, comprising:

5 first segmentation means for making subband segmentation of the input moving image data into in units of frames using wavelet transformation;

second segmentation means for making subband segmentation of the input moving image data in units of fields using wavelet transformation;

10 arithmetic means for making an arithmetic process of first subbands obtained by said first segmentation means; and

15 discrimination means for discriminating based on a first arithmetic value obtained by said arithmetic means if said first or second segmentation means is applied to the input moving image data.

20 2. The apparatus according to claim 1, wherein said arithmetic means also makes the arithmetic process for second subbands obtained by said second segmentation means to output a second arithmetic value.

25 3. The apparatus according to claim 2, wherein said discrimination means discriminates based on the first and second arithmetic values if said first or second segmentation means is applied to the input moving image data.

4. The apparatus according to claim 1, wherein said discrimination means discriminates based on a

comparison result between the first arithmetic value and a predetermined value if said first or second segmentation means is applied to the input moving image data.

5 5. The apparatus according to claim 1, wherein a discrimination result of said discrimination means is generated as identification information.

6. The apparatus according to claim 1, wherein said arithmetic means makes the arithmetic process of a  
10 high-frequency subband obtained after the input moving image data has undergone vertical subband segmentation.

7. The apparatus according to claim 1, wherein said arithmetic means makes the arithmetic process of a  
15 high-frequency subband obtained after the input moving image data has undergone vertical subband segmentation and horizontal subband segmentation.

8. The apparatus according to claim 1, wherein said arithmetic means makes the arithmetic process for  
20 computing one of an entropy, signal power, and variance of the subband.

9. The apparatus according to claim 1, wherein when said discrimination means determines that said second segmentation means is applied, vertical subband  
segmentation by said second segmentation means uses  
25 data obtained after said first segmentation means executes horizontal subband segmentation of the input moving image data.

10. An image processing apparatus for decoding encoded moving image data, comprising:

decoding means for decoding encoded data which contains identification information indicating a process in units of frames or fields, and is obtained by encoding at least subband segmented data;

first synthesis means for making subband synthesis in units of frames using wavelet transformation for decoded data decoded by said decoding means;

second synthesis means for making subband synthesis in units of fields using wavelet transformation for decoded data decoded by said decoding means; and

discrimination means for discriminating based on the identification information contained in the decoded data decoded by said decoding means if said first or second synthesis means is applied to the decoded data.

11. The apparatus according to claim 10, wherein the decoded data consists of predetermined unit decoded data groups, and the identification information is included in each predetermined unit decoded data group.

12. An image processing method for encoding input moving image data, comprising:

the first, segmentation step of making subband segmentation of the input moving image data in units of frames using wavelet transformation;

the second segmentation step of making subband segmentation of the input moving image data in units of fields using wavelet transformation;

the arithmetic step of making an arithmetic  
5 process of first subbands obtained in the first segmentation step; and

the discrimination step of discriminating based on a first arithmetic value obtained in the arithmetic step if the first or second segmentation step is  
10 applied to the input moving image data.

13. The method according to claim 12, wherein the arithmetic step includes the step of also making the arithmetic process for second subbands obtained in the second segmentation step to output a second arithmetic  
15 value.

14. The method according to claim 13, wherein the discrimination step includes the step of discriminating based on the first and second arithmetic values if the first or second segmentation step is applied to the  
20 input moving image data.

15. The method according to claim 12, wherein the discrimination step includes the step of discriminating based on a comparison result between the first arithmetic value and a predetermined value if the first  
25 or second segmentation step is applied to the input moving image data.

16. The method according to claim 12, wherein a discrimination result in the discrimination step is generated as identification information.

17. The method according to claim 12, wherein the  
5 arithmetic step includes the step of making the arithmetic process of a high-frequency subband obtained after the input moving image data has undergone vertical subband segmentation.

18. The method according to claim 12, wherein the  
10 arithmetic step includes the step of making the arithmetic process of a high-frequency subband obtained after the input moving image data has undergone vertical subband segmentation and horizontal subband segmentation.

19. The method according to claim 12, wherein the  
15 arithmetic step includes the step of making the arithmetic process for computing one of an entropy, signal power, and variance of the subband.

20. The method according to claim 12, wherein when it  
20 is determined in the discrimination step that the second segmentation step is applied, vertical subband segmentation in the second segmentation step uses data obtained after horizontal subband segmentation of the input moving image data is executed in the first  
25 segmentation step.

21. An image processing method for decoding moving image data encoded using wavelet transformation, comprising:

the decoding step of decoding encoded data which  
5 contains identification information indicating a process in units of frames or fields, and is obtained by encoding at least subband segmented data;

the first synthesis step of making subband synthesis in units of frames for decoded data decoded  
10 in the decoding step;

the second synthesis step of making subband synthesis in units of fields for decoded data decoded in the decoding step; and

the discrimination step of discriminating based  
15 on the identification information contained in the decoded data decoded in the decoding step if the first or second synthesis step is applied to the decoded data.

22. The method according to claim 21, wherein the decoded data consists of predetermined unit decoded  
20 data groups, and the identification information is included in each predetermined unit decoded data group.

23. A computer readable memory that stores a program code of an image process for encoding input moving image data, comprising:

25 a program code of the first segmentation step of making subband segmentation of the input moving image data in units of frames using wavelet transformation;

a program code of the second segmentation step of making subband segmentation of the input moving image data in units of fields using wavelet transformation;

a program code of the arithmetic step of making  
5 an arithmetic process of first subbands obtained in the first segmentation step; and

a program code of the discrimination step of discriminating based on a first arithmetic value obtained in the arithmetic step if the first or second  
10 segmentation step is applied to the input moving image data.

24. A computer readable memory that stores a program code of an image process for decoding moving image data encoded using wavelet transformation, comprising:

15 a program code of the decoding step of decoding encoded data which contains identification information indicating a process in units of frames or fields, and is obtained by encoding at least subband segmented data;

20 a program code of the first synthesis step of making subband synthesis in units of frames for decoded data decoded in the decoding step;

a program code of the second synthesis step of making subband synthesis in units of fields for decoded  
25 data decoded in the decoding step; and

a program code of the discrimination step of discriminating based on the identification information

contained in the decoded data decoded in the decoding step if the first or second synthesis step is applied to the decoded data.

25. An image processing apparatus for encoding input  
5 moving image data, comprising:

first segmentation means for making horizontal subband segmentation of the moving image data using wavelet transformation;

10 discrimination means for discriminating a type of subband segmentation to be applied to the moving image data on the basis of subbands obtained by said first segmentation means; and

15 second segmentation means for making subband segmentation of the moving image data in units of frames or fields using wavelet transformation on the basis of a discrimination result of said discrimination means.

26. The apparatus according to claim 25, wherein said discrimination means discriminates the type of subband  
20 segmentation applied to the moving image data on the basis of a low-frequency subband of the subbands obtained by said first segmentation means.

27. The apparatus according to claim 26, wherein said discrimination means computes a sum of absolute values  
25 of differences between pixels which form the low-frequency subband, and discriminates the type of



subband segmentation applied to the moving image data on the basis of the computed value.

28. The apparatus according to claim 26, wherein said discrimination means discriminates the type of subband segmentation applied to the moving image data on the basis of pixels obtained by decimating pixels which form the low-frequency subbands in one or both of horizontal and vertical directions.

29. The apparatus according to claim 26, wherein said discrimination means recursively makes horizontal subband segmentation of the low-frequency subband, and discriminates the type of subband segmentation applied to the moving image data on the basis of a final low-frequency subband.

30. The apparatus according to claim 25, further comprising encoding means for generating encoded data containing subbands obtained by said second segmentation means, and identification information indicating a discrimination result of said discrimination means.

31. An image processing method for encoding input moving image data, comprising:

the first segmentation step of making horizontal subband segmentation of the moving image data using wavelet transformation;

the discrimination step of discriminating a type of subband segmentation to be applied to the moving

image data on the basis of subbands obtained in the first segmentation step; and

the second segmentation step of making subband segmentation of the moving image data in units of  
5 frames or fields using wavelet transformation on the basis of a discrimination result in the discrimination step.

32. The method according to claim 31, wherein the discrimination step includes the step of discriminating  
10 the type of subband segmentation applied to the moving image data on the basis of a low-frequency subband of the subbands in the said first segmentation step.

33. The method according to claim 32, wherein the discrimination step includes the step of computing a  
15 sum of absolute values of differences between pixels which form the low-frequency subband, and discriminating the type of subband segmentation applied to the moving image data on the basis of the computed value.

20 34. The method according to claim 32, wherein the discrimination step includes the step of discriminating the type of subband segmentation applied to the moving image data on the basis of pixels obtained by decimating pixels which form the low-frequency subbands  
25 in one or both of horizontal and vertical directions.

35. The method according to claim 32, wherein the discrimination step includes the step of recursively

making horizontal subband segmentation of the low-frequency subband, and discriminating the type of subband segmentation applied to the moving image data on the basis of a final low-frequency subband.

5 36. The method according to claim 31, further comprising the encoding step of generating encoded data containing subbands obtained in the second segmentation step, and identification information indicating a discrimination result of the discrimination step.

10 37. A computer readable memory that stores a program code of an image process for encoding input moving image data, comprising:

a program code of the first segmentation step of making horizontal subband segmentation of the moving

15 image data using wavelet transformation;

a program code of the discrimination step of discriminating a type of subband segmentation to be applied to the moving image data on the basis of subbands obtained in the first segmentation step; and

20 a program code of the second segmentation step of making subband segmentation of the moving image data in units of frames or fields using wavelet transformation on the basis of a discrimination result in the discrimination step.